

# URBAN WATERSHEDS FORUM



RESTORE OUR  
**WATERS**

In partnership with Seattle Public Utilities

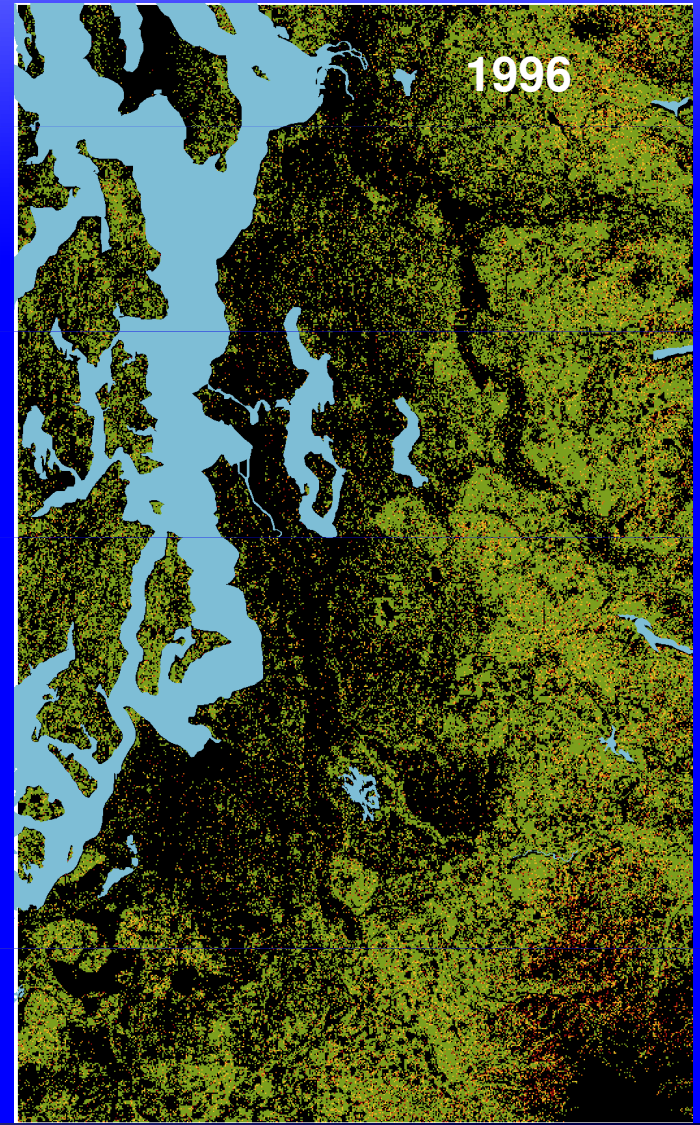
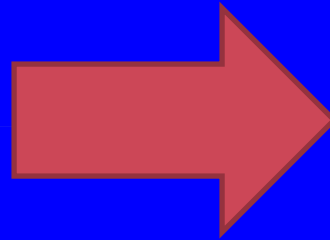
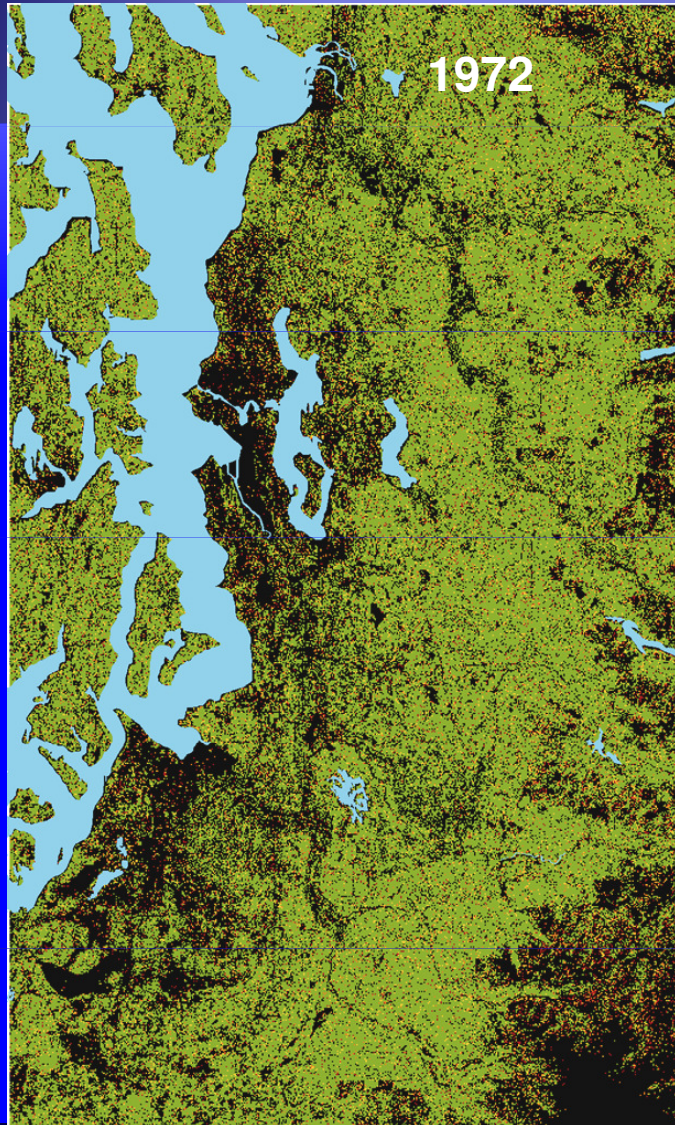


# Healthy Urban Watersheds

- ◆ Clean Water is essential for all aspects of urban life
- ◆ Humans are an integral component in our urban ecosystems
- ◆ Daily activities and land-use can significantly degrade ecosystems
- ◆ We all have a part to play



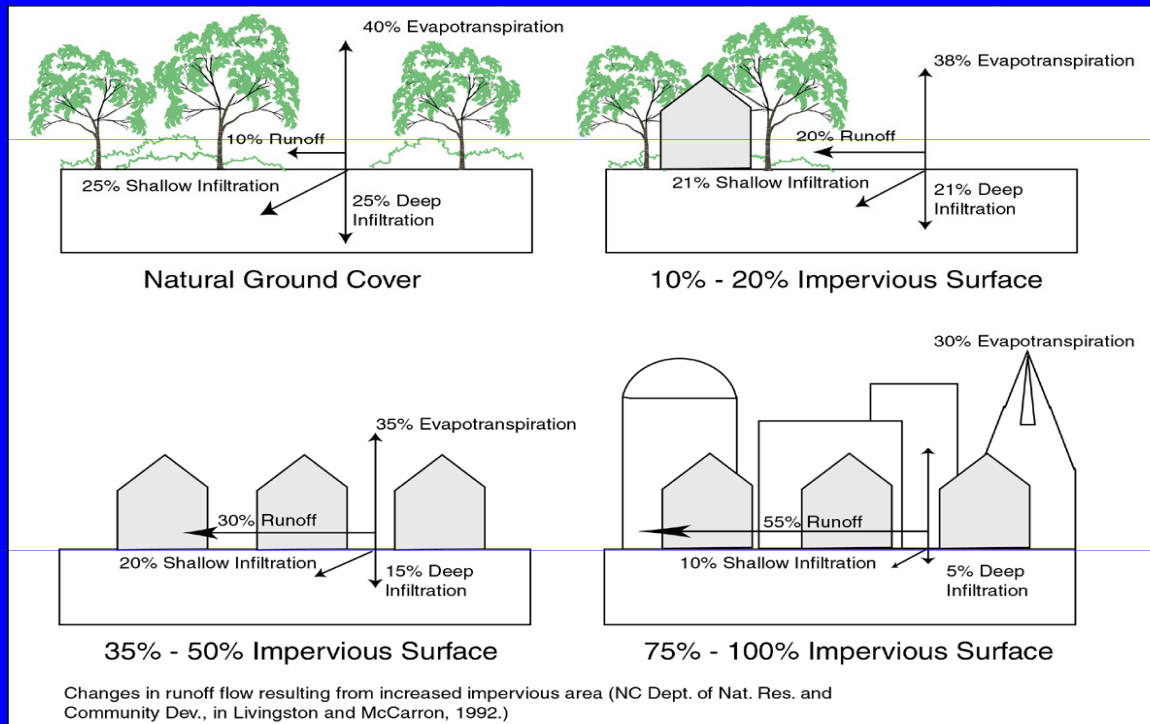
# Urbanization – *An Incremental Process*





# Urbanization

- Loss of Natural Forest Cover
- Loss of Wetland Storage
- Landscape Fragmentation
- Loss & Compaction of Native Soils
- **Increase in Impervious Surfaces**





# Watershed Characteristics: Land Use

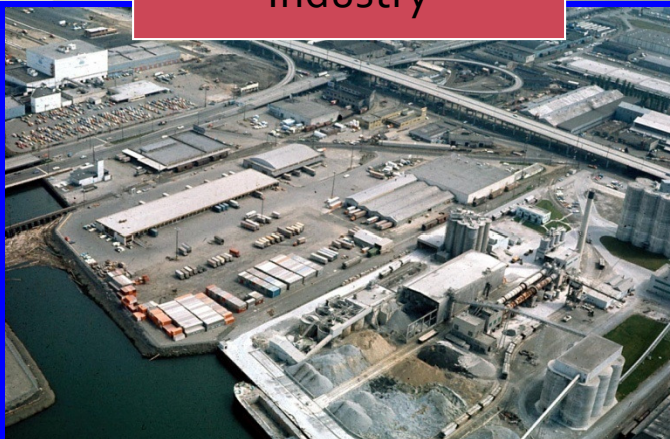
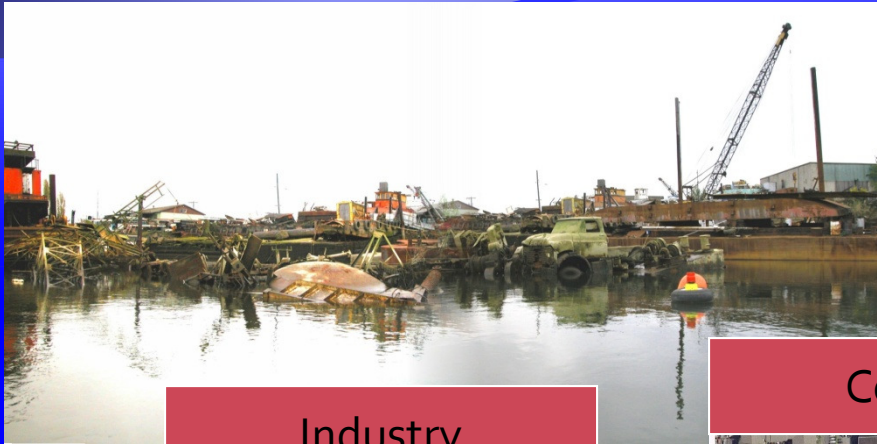
Roadways



Commercial



Industry



Past and Current Practices

Residential



# *Problem Summary*

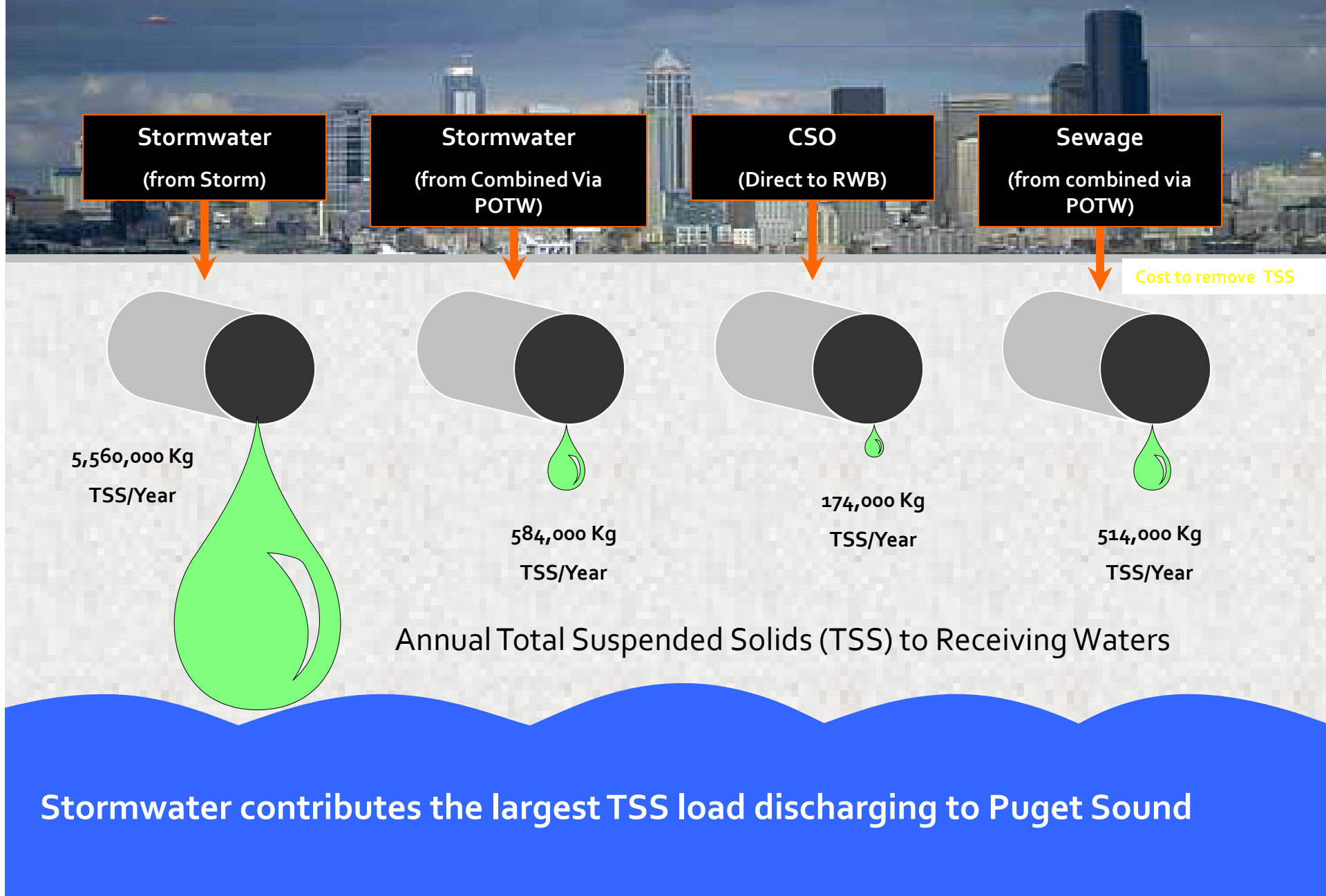


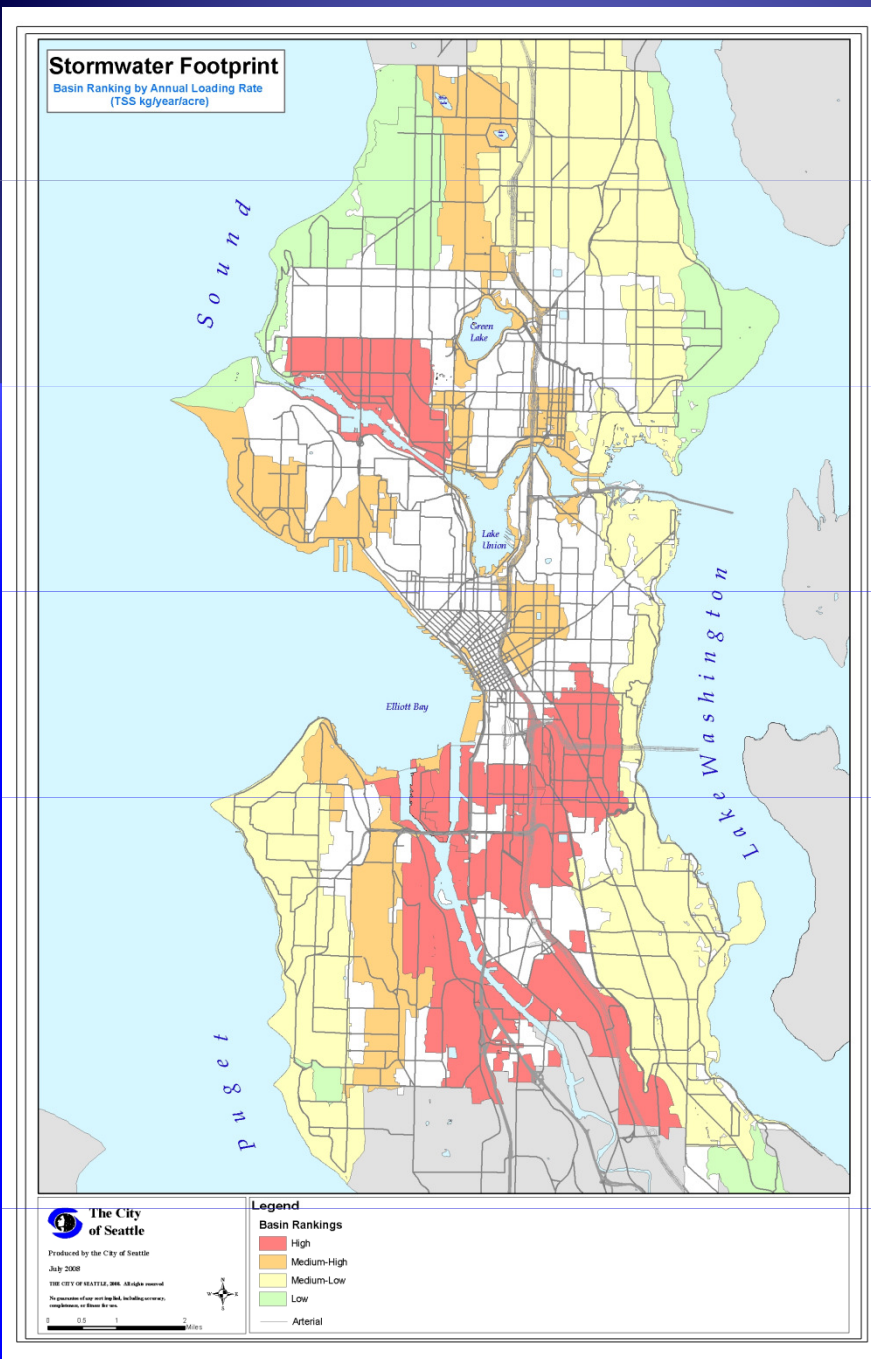
- **Urban Runoff** (Volume & High Flows)
- **Flooding** (Infrastructure & Property Damage)
- **Stormwater Pollution**
  - Sediment & Siltation
  - Toxic Chemicals (Metals/Organics)
  - Petroleum Hydrocarbons
- **Degraded Habitat** (Aquatic & Forest)
- **Impaired Biological Integrity**





# Pollutant Loading



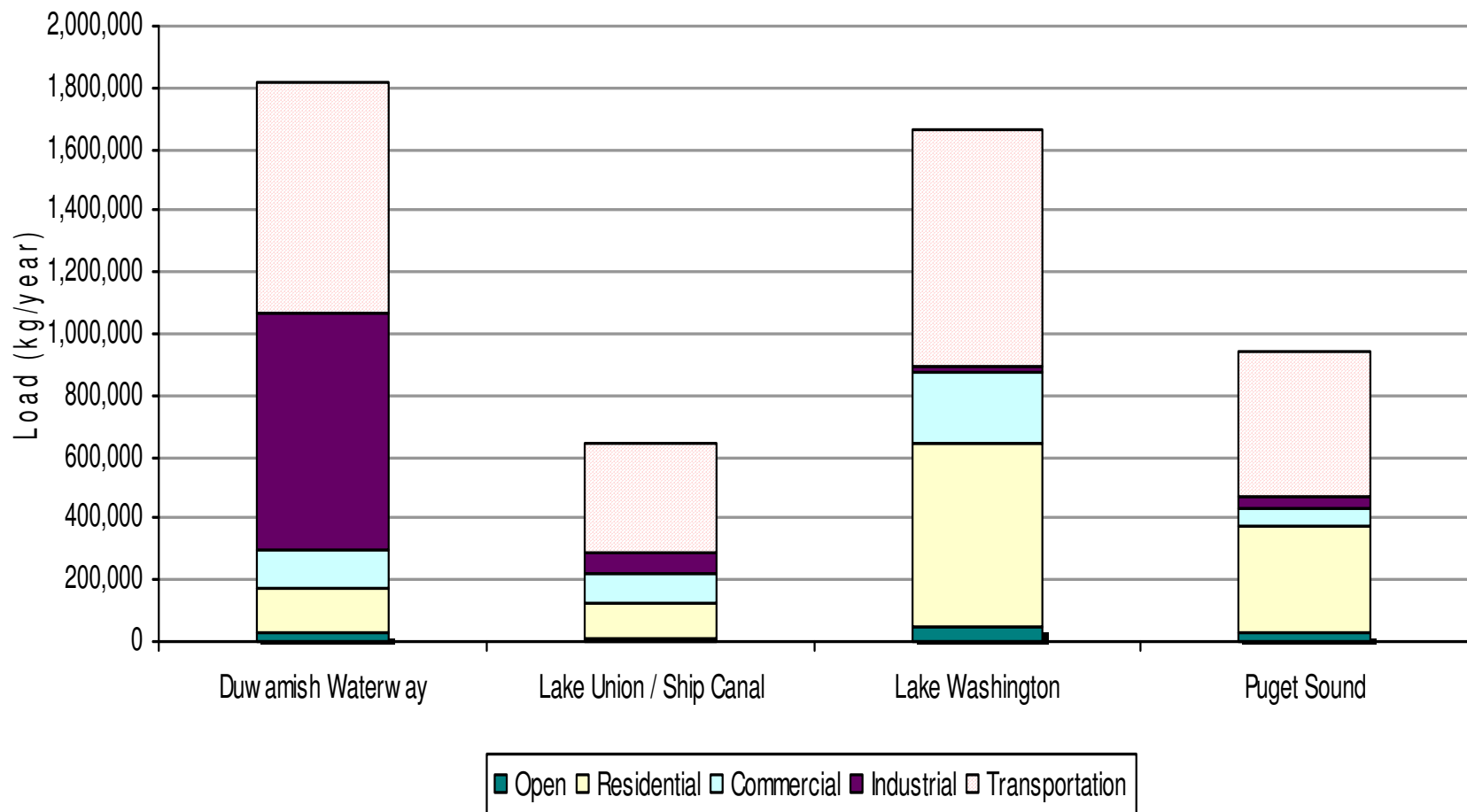


## Pollutant Loading

- ♦ WWW (Duwamish)
- ♦ EWW (Duwamish)
- ♦ Duwamish River
- ♦ Ship Canal
- ♦ Lake Union South
- ♦ Lake Union North
- ♦ Puget Sound Central
- ♦ Lake Washington Central



# ***Roads are the largest source of runoff and stormwater pollution***



# *Road Runoff Reduction*

What is the City doing?

- Reduce Impervious
- Street Sweeping
- Drain Inlet Cleaning
- Green Stormwater Infrastructure
  - Natural Drainage Systems
- Mass-Transit (Metro & ST)
- SDOT “Way to Go” Program



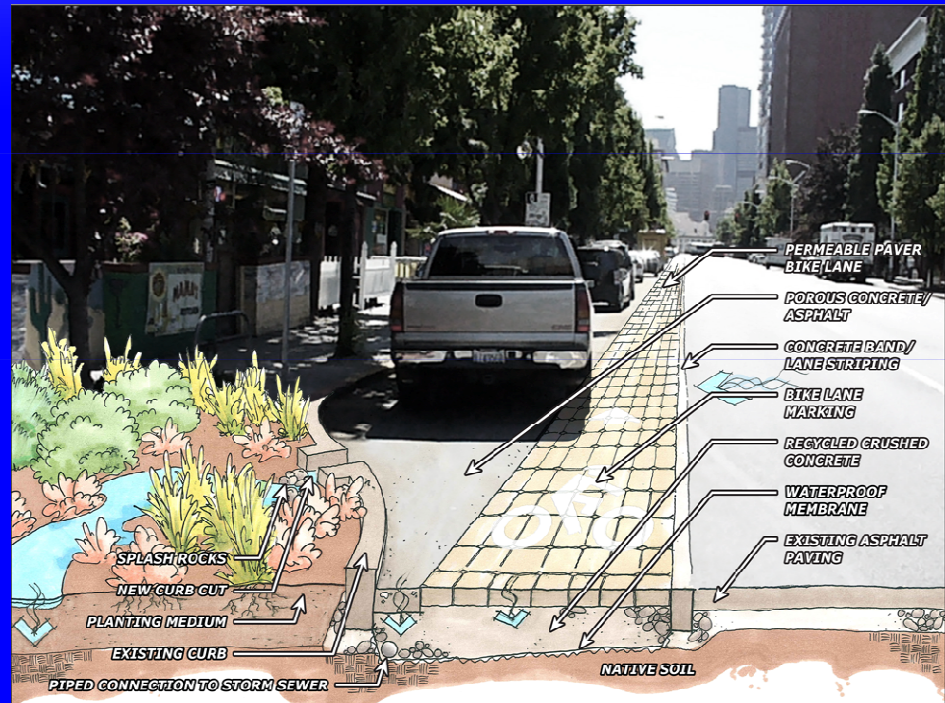
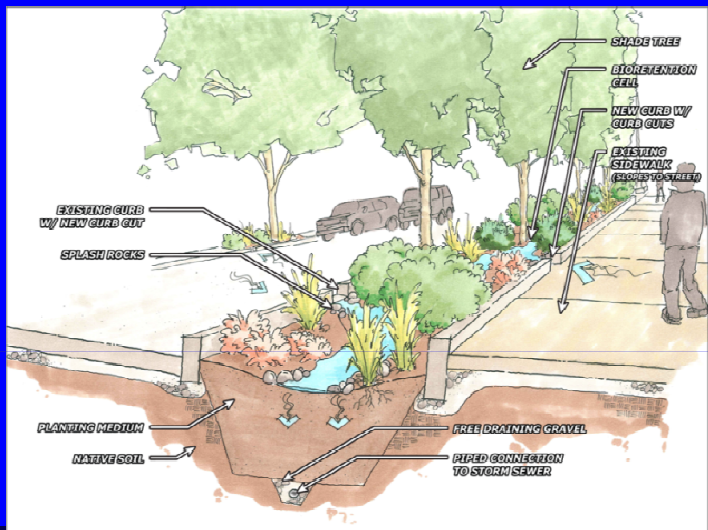








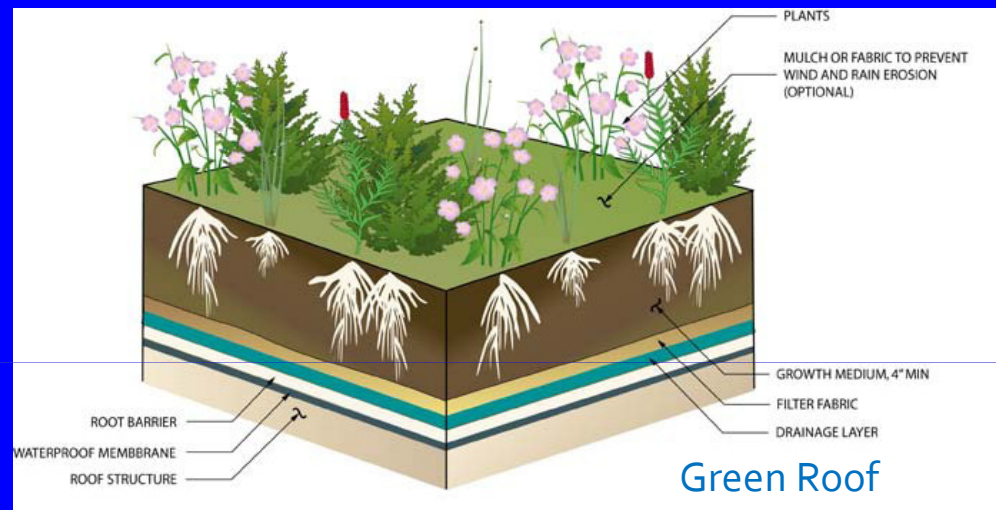
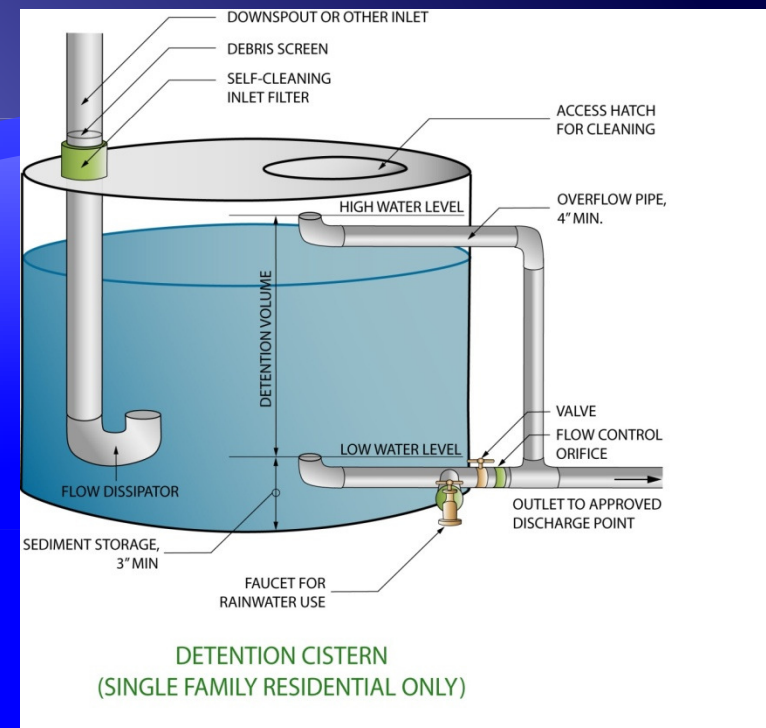
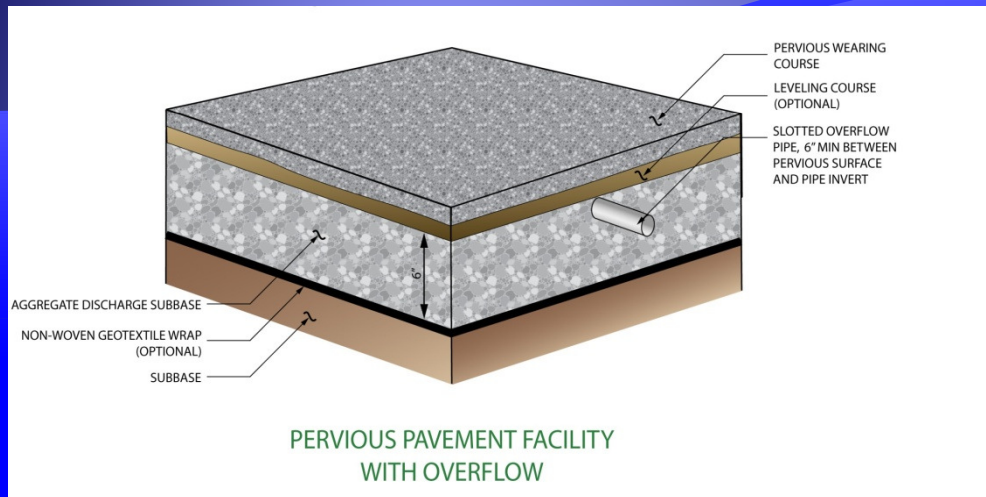




# *Road Runoff Reduction*

What can citizens do?

- Drive Less (Carpool/Transit/Bike)
- Proper Vehicle Maintenance
- Install Permeable Driveways
- Rain-Wise Program Participation
  - Rain Barrels & Cisterns
  - Rain Gardens





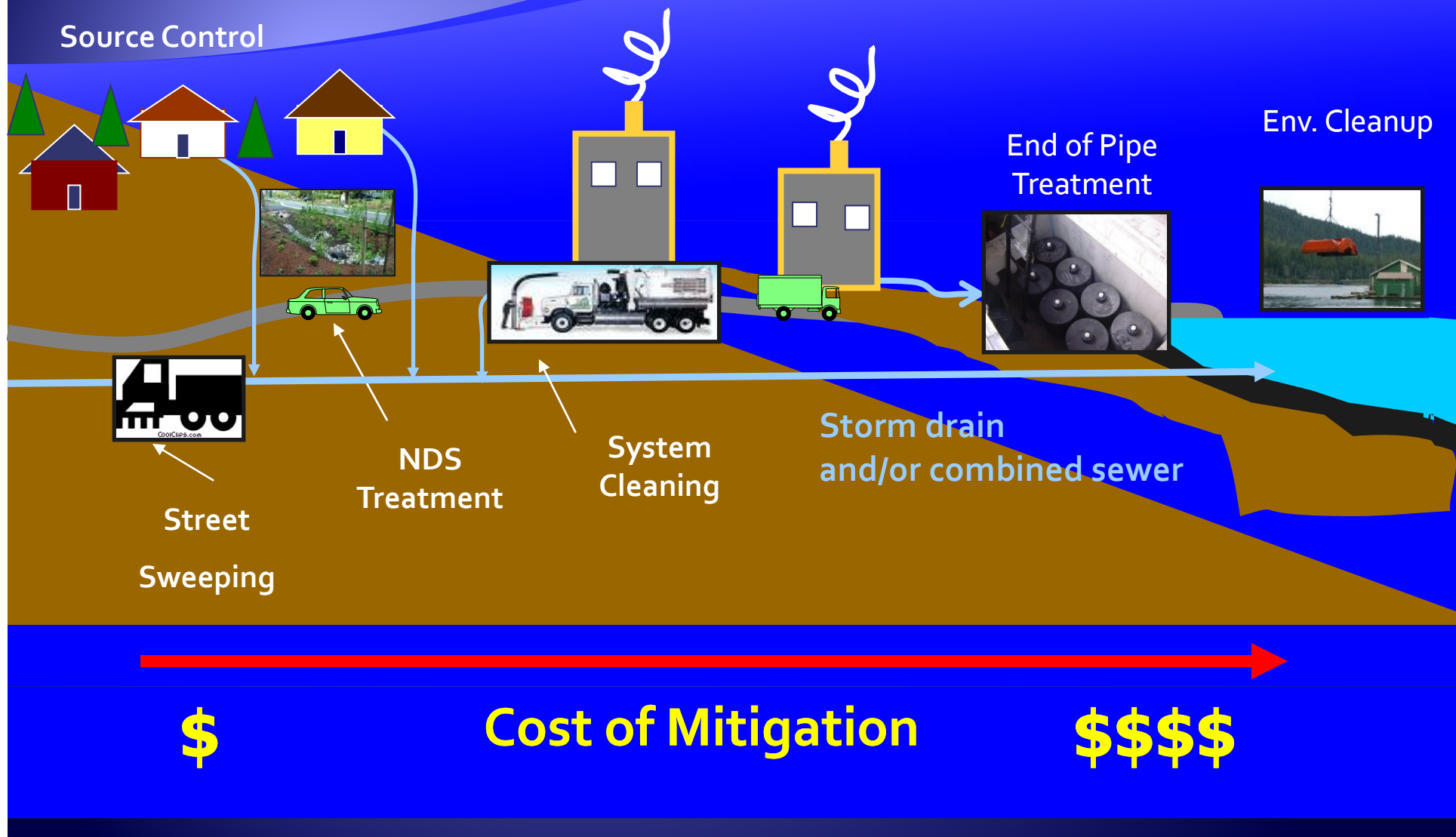
# ***Pollution Prevention***

What is the City doing?



- **Business Inspections**
- **CSO Reduction Program**
- **Illicit Discharge Elimination**
- **Education & Outreach**
- **Spill Prevention & Source Control**
- **Chemical Use Reduction**

# Pollutant Pathways & Relative Cost of Mitigation

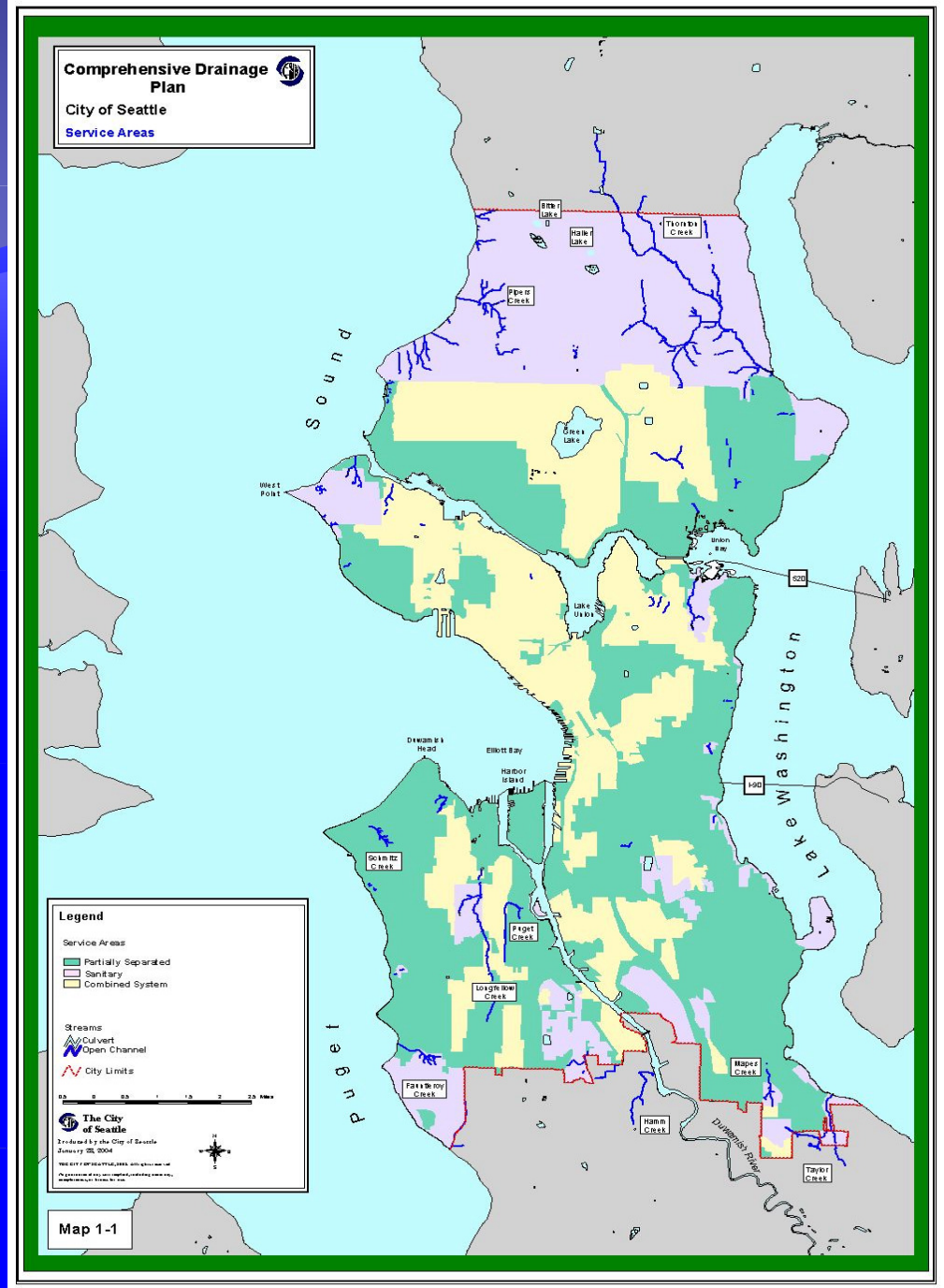


## Seattle has three types of Drainage & Wastewater systems:

Ditch and Culvert with  
Separate Sanitary  
Sewers (purple)

Public Storm Drain  
System with Separate  
Sanitary Sewers (green)

Public Combined Sewer  
System (yellow)





# Combined Sewer Overflow (CSO)



Non-Storm  
Normal System Operation

CSO Event  
Discharge to Receiving Water

# ***Pollution Prevention***

What can citizens do?

- **Minimize Home & Yard Chemical Use**
  - Pesticides & Herbicides
  - Cleaning Products
  - Personal Care Products
- **Proper Disposal of Hazardous Materials**
- **Pet-Waste Pick-up**
- **Composting & Recycling**

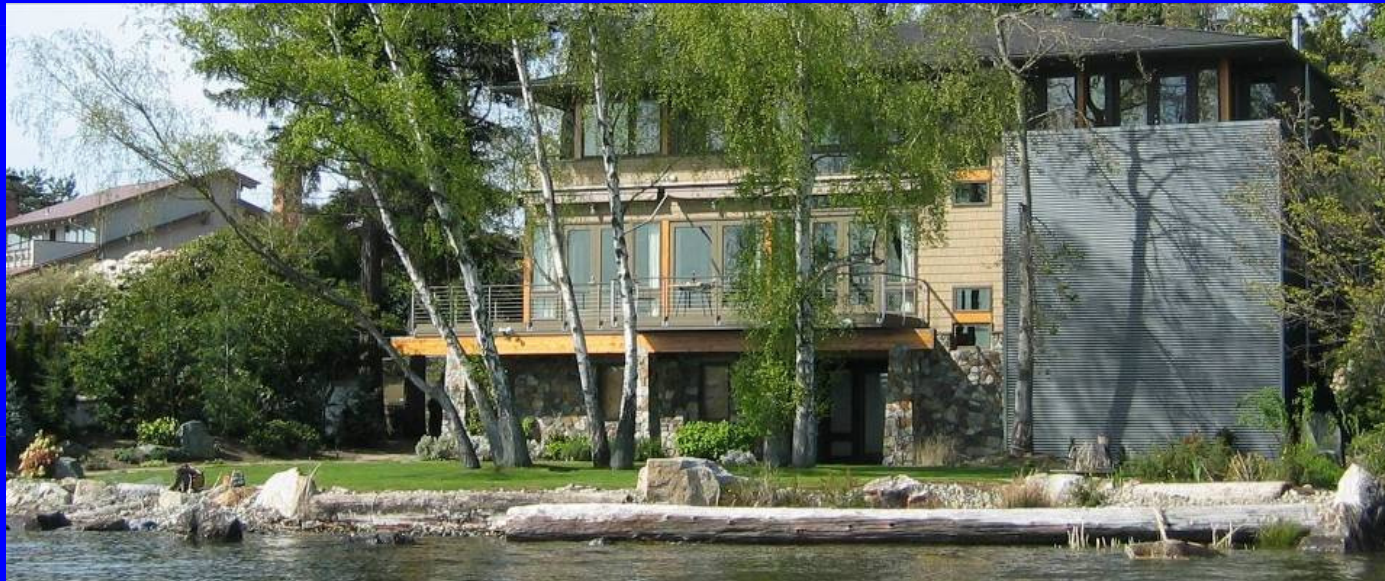


# *Habitat Enhancement*

What is the City doing?

- Green Seattle Partnership
- Riparian Restoration
- Shoreline Restoration
- Floodplain Restoration
- Stream Day-Lighting Initiative





# *Habitat Enhancement*

What can citizens do?

- Backyard Floodplain Projects
- Riparian Restoration
- Shoreline Restoration
- Volunteer Stewardship



# *Biological Integrity*

What is the City doing?

- Pre-Spawn Mortality (PSM) Research
  - NOAA
- Urban Watershed Fish Research
  - USFWS
- BIBI Monitoring



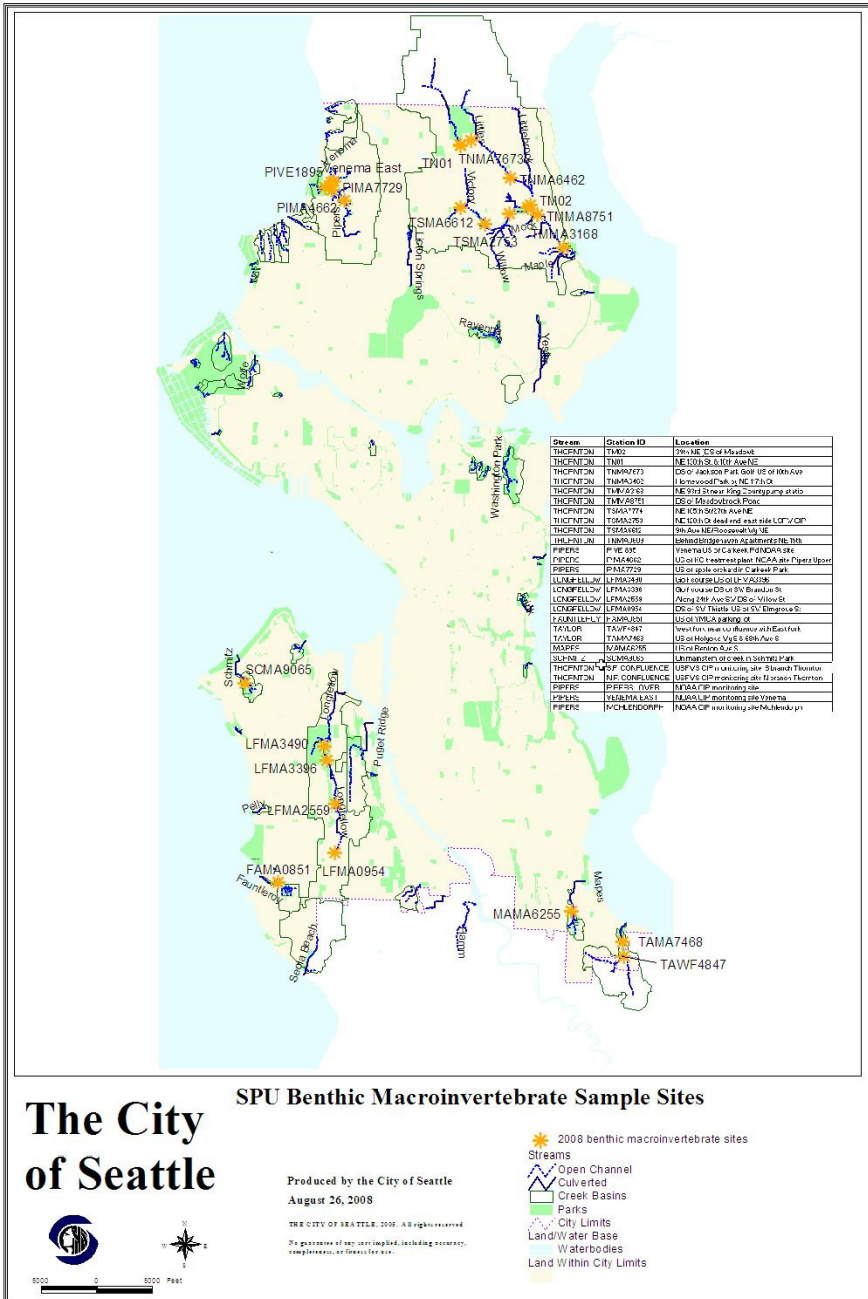
# Pre-Spawn Mortality Research

Collaborative effort with  
NOAA-Fisheries



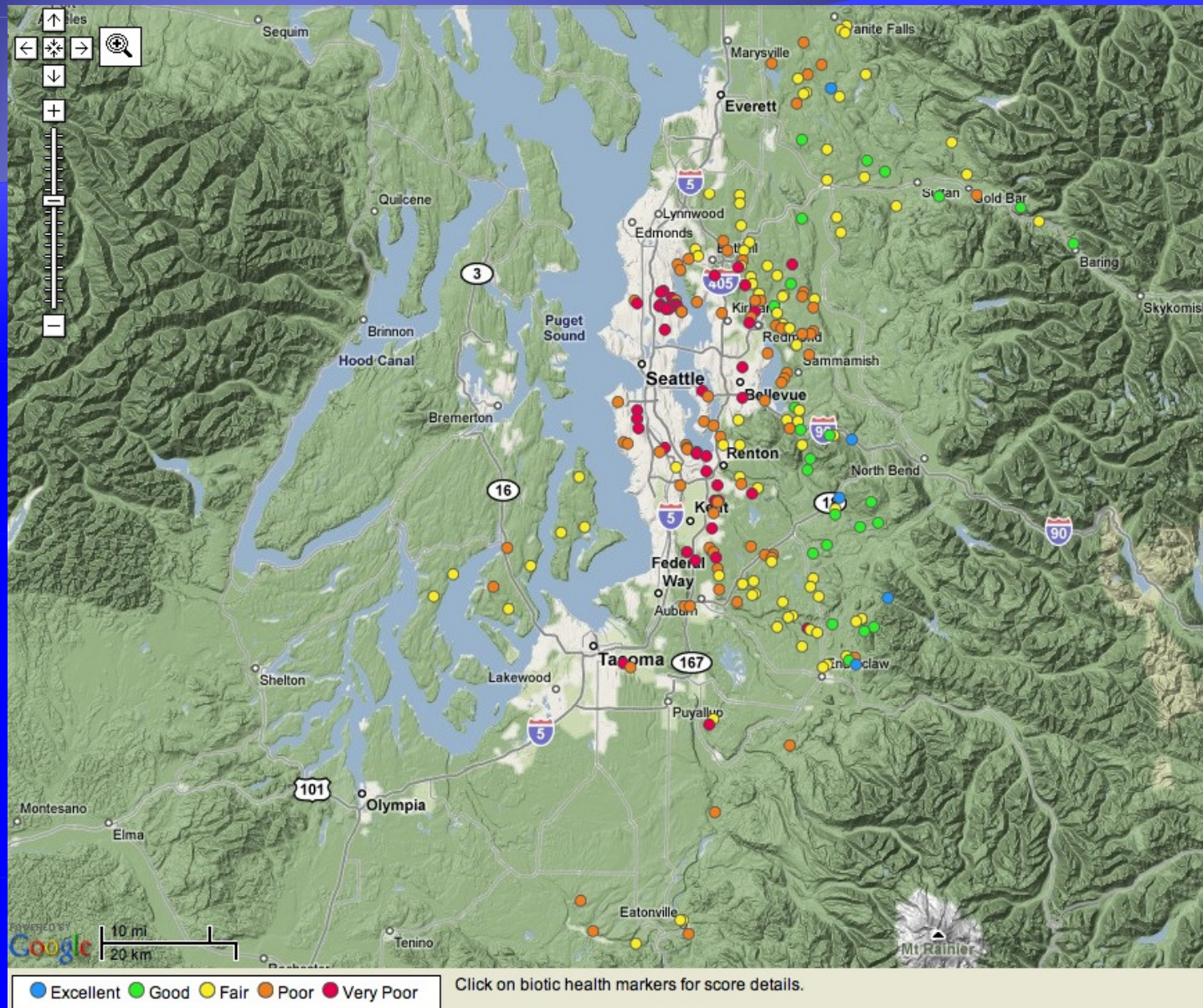


## A photograph showing three individuals engaged in a field activity, likely water sampling or environmental study, in a shallow stream. The person on the left is bent over, reaching into the water, wearing a blue shirt, tan pants, and a white cap. The person in the center is standing, holding a white container, wearing a white shirt and green waders. The person on the right is standing, holding a white container, wearing a white shirt and white waders. The stream is surrounded by dense green foliage and trees, and the water is clear and shallow.





# Seattle is part of the Puget Sound Bio-Monitoring Consortium



# Thank You!



# Questions?